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ANTE-PARTUM OPHTHALMIA NEONATORUM
(INTRA-UTERINE OPHTHALMIA)

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BY

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~~OF BALTIMORE.~~



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**ANTE-PARTUM OPHTHALMIA NEONATORUM.
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BY HARRY FRIEDENWALD, M.D.,
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A NUMBER of States have passed laws with a view to decrease the still large proportion of blindness due to ophthalmia neonatorum. Among these States we are happy to name Maryland, whose last Legislature showed its wisdom in enacting a law making it a punishable offence for a midwife or other person having charge of an infant to treat any ophthalmia, and necessitating the calling of a physician. These laws are the outcome of the experience that ophthalmia neonatorum is a very tractable disease when properly cared for. Some physicians have gone so far as to claim that this disease is always curable when treated early. But even our best ophthalmic surgeons occasionally lose a case through corneal involvement, and recent discussion proves that it is an unavoidable accident in an *exceedingly small number* of cases.¹

It is important to examine into the various conditions under which cases are lost and to determine how they lead to blindness in spite of prophylactic measures and of early and proper treatment.

¹ Randall: Trans. Amer. Ophth. Soc., 1893. Woods: Annals of Ophth. and Otol., 1894.



Ophthalmia neonatorum develops, as a rule, on the second or third day after birth. Infection usually occurs during the passage of the child's head through the vagina. The intervening time is known as the period of incubation, during which the eye presents no signs whatever of disease. This period lasts at least twenty-four hours. It so rarely happens that the disease makes its appearance earlier than the second or third day that none of our textbooks makes mention of it. And yet there are a number of cases on record of children born with the well-marked signs of this disease. In these cases the period of incubation had passed, and the stage of inflammation was more or less advanced at birth.

The entire number of such cases that I have been able to collect in medical literature is eighteen. They are as follows :

1. Hirschberg¹ saw a child, twelve hours old, with well-marked ophthalmia neonatorum; there was swelling of the lids, pus in the conjunctival folds, and a diffuse opacity of both corneæ. Labor had been easy, but the membranes had ruptured three days before. The final result was a small eukoma of the right cornea and phthisis bulbi of the left eye.

2. Rivaud-Landrau² has published a case of complete destruction of the cornea from ophthalmia two days after birth.

3. Magnus³ found ophthalmia fully developed five hours after birth. The membranes had ruptured

¹ Beitr. zur prakt. Augenheilk., Berlin, 1876.

² Cited by Hirschberg.

³ Zehender's Monatsbl. für Augenheilk., 1887, p. 389.

almost three days before. Both corneæ had gray infiltrations at birth. Large opacities remained.

4. Paryschev's¹ case, in which the membranes ruptured three days before birth. There was typical ophthalmia when the child was born, and extensive opacities of the corneæ. The purulent secretion contained many gonococci. He advises prophylactic vaginal irrigation after the membranes have ruptured, using a solution of mercuric chlorid (1:2000 or 1:3000) for this purpose.

5. Krukenberg² demonstrated a child which presented swelling of the eyelids and conjunctiva, and cloudiness of the right cornea, when born. Gonococci were found in the conjunctival secretion (not purulent) and also in the vagina of the mother. The rupture of the membranes had taken place two days before birth.

6. He mentions that Keller had a similar case, in which the rupture of the membranes had occurred seventeen hours before birth.

7. Feis³ reports a case of marked ophthalmia neonatorum (great swelling of both upper lids and profuse yellow, watery secretion) without involvement of the corneæ. There were gonococci in numbers. The mother had no vaginal discharge, but a greenish-yellow cervical secretion adhered to the examining finger (latent gonorrhea). The vagina was frequently irrigated with a 1½ per cent. solution of carbolic acid. The author believes that the infectious cervical secretion was carried to the eyes of the infant by the examining finger. In Haussmann's *Bindehaut-infektion bei Neugeborenen*, 1882, mention is made of

¹ Summarized in Hirshberg's Centralbl., 1893, p. 64.

² Verhandl. d. Gesellsch. f. Geburtsh. und Gynaekol., June, 1891.

³ Centralbl. f. Gynaekol., 1892, No. 45.

8. Galezowski's case of ophthalmia neonatorum noticed at birth, but the details are not given.

9. Feis cites a case that occurred at the Vienna "Findelhaus" in 1863. The child was born with both corneæ destroyed and the irides prolapsed, in consequence of intra-uterine ophthalmia.

10. Haussmann¹ reports a case in which redness and swelling of the conjunctiva were noticed at birth, the affection disappearing in several days; the rupture of the membranes had not occurred prematurely. The author assumes that the pathogenic substances had made their way through the unbroken membranes.

11. Winckel² has reported a case of ophthalmia in a child when born, but we have been unable to get the details.

Bellouard³ reports the following cases as occurring in the practice of Dianoux, Guilbaud, and himself.

12. Dianoux had a patient suffering with vaginal blennorrhœa for several months. Fearing ophthalmia neonatorum, he used injections of sublimate (1 : 100) and of silver nitrate (1 : 100). Labor was rapid. On account of the numerous injections it was impossible to tell when the membranes had ruptured. One hour after birth a few drops of a 2 per cent. solution of silver nitrate were instilled. In ten hours the lids were tumefied, but the affection was rapidly checked by treatment.

13. Dianoux was called to a case of ophthalmia neonatorum which had made its appearance on the day that the child was born. The inflammation

¹ Loc. cit.

² Ber. a. d. k. saechs. Entbind. Inst. in Dresden, 1876-78. Leipzig, 1879, vol. iii, p. 217.

³ Étude sur l'apparition precoce de l'ophtalmie purulente chez les nouveau-nés, par Bellouard. Paris, 1892. Thesis.

greatly increased, and one cornea was much damaged. The mother had had a vaginitis, but it had been treated with care. The membranes had broken two days before birth.

14. Guilbaud saw a case in which the membranes had ruptured sixty hours before birth. The child's eyelids were enormously swollen when it was born, and pus and blood were discharged when the lids were opened. They were treated with boric acid, and later with silver nitrate, and were completely cured. The mother had had a vaginitis.

15. In one of Bellouard's cases labor began at 3 A.M., at which time the bag of waters was found intact. At 11 A.M. the child was born. Repeated examinations were made by students. At the moment of birth the lids were found agglutinated, red, and swollen. A 2 per cent. solution of silver nitrate was instilled. At 4 P.M., thick greenish pus was discharged. Recovery was rapid. The mother had leukorrhea for four months before labor.

16. In another case of Bellouard's rupture took place nineteen hours before birth, at the beginning of labor. At birth the lids were red and swollen, and three hours later there was an abundant discharge of a thick fluid. The eyes were entirely closed. The mother had a severe vaginitis, and enormous vegetations. In these cases frequent examinations had been made during labor.

17. In Looten's case¹ the child was admitted to the hospital one day after it was born, at which time there was chemosis of the eyelids that had probably existed for at least twenty-four hours. The cornea of one eye was involved.

18. Fers² reports the case of a child, born fifty-

¹ Thesis, Paris, 1875. Cited by Bellouard.

² North American Practitioner. Cited in Hirschberg's Centralblatt, 1893, p. 557.

four hours after rupture of the membranes, presenting well-marked blennorrhea of both eyes. Gonococci were discovered in the secretion.

19. The following case came under my observation at the "Maternité" of Baltimore. The mother had chancroids and venereal warts. The child was born July 2, 1890, the mother having been in labor for two days. The membranes broke at 6.15 A.M., and the child was delivered at 9 A.M. of the same day. Silver nitrate (2 per cent.) was instilled immediately; within one hour after birth, when the child was washed, the nurse noticed that there was pus in the eyes, and called the attention of the resident physician, Dr. S. H. Allen, to it. I was called on the following day, and found the eyes discharging a yellowish fluid; there was not much swelling; there were opacities of both corneæ, but no ulcers. The treatment consisted in the application of cold and silver nitrate. The child was discharged July 30th, with large opacities of both corneæ.¹

These nineteen cases are all that I have been able to collect, though using great care; this indicates that intra-uterine infection is very rare.

¹ Since writing this paper the following notes have been received from Dr. Edith Eareckson, of this city: She was called to attend a colored girl in her second confinement, March 17, 1893, and was informed that the membranes had ruptured eight hours before she arrived. The labor was tedious, there being a face-presentation, and the child was not born till seven hours later. At birth the eyelids were much swollen and tightly closed. When forced open to use Credé's preventive, silver nitrate, muco-pus jetted out. The eyes were washed as thoroughly as possible with a solution of mercuric chlorid, and a 1 per cent. solution of silver nitrate was dropped in. Nine hours later much pus was again found in both eyes. The condition of the corneæ was not noted. After the fifth day the case passed out of her treatment, and nothing further was heard of it.

When did infection occur in these cases? Probably soon after the rupture of the membranes, the infectious material being carried in most cases by the finger of the examining physician or midwife. In seven cases the rupture occurred between forty-eight and seventy-two hours before birth. In seven the time of rupture is not stated; in two it occurred from seventeen to nineteen hours before birth, and in one (Bellouard, 1) it took place within eight hours; in another (Haussmann) it is said to have occurred shortly before delivery, while in my own case it appeared to have taken place only three hours before. Haussmann assumed that the pathogenic agents passed through the unbroken membranes. Bellouard thinks that there was a lateral rupture of the membranes, sufficiently large to admit the entrance of the poison, but not permitting the entire fluid to escape, for the bag was distinctly felt eight hours before the child was born. In my case the inflammation had passed through the period of incubation, and there was pus in the conjunctival sacs at birth; infection must have occurred at least twenty-four hours before birth, and twenty-one hours before the amniotic fluid escaped. I am unwilling to accept Haussmann's explanation,¹ that the poison passed through the unbroken membranes, and think it more likely

¹ This assumption is also made by Nieden, *Zehender's Monatsbl.*, 1891, p. 353, to explain the appearance of an ophthalmia in an infant born in unbroken membranes. The child was taken out of the sac by the physician with the greatest care. And yet the eyes became inflamed in twenty-four hours in the characteristic manner, though gonococci were not to be found in the secretion. Nieden assumes that the amniotic fluid was infected by the diffusion of a poisonous substance which was capable of producing an inflammation similar to that due to the gonococci,

that there is an error of observation, *i. e.*, that there was an earlier rupture than stated, with probably partial discharge of the fluid, as is assumed by Belouard.

As the infection occurs at varying lengths of time before delivery we should expect to find the inflammation in different stages of development. This is actually the case. Thus, in some the inflammation began to show itself a few hours after birth, and in one the eyes were completely destroyed at birth.

The number of eyes that were thus lost by corneal involvement is exceedingly large. The result is stated in fourteen of the cases ; in five of these the cornea escaped, but in nine corneal opacities resulted. Though the total number of cases reported is not large, still we do not hesitate to call this form of ophthalmia exceedingly dangerous. We would attribute the virulence of these cases in part to the prolonged contact of the eyes with the poison. In cases in which infection occurs during the short time that it takes for the head to pass through the vagina, the contact may be very short, and then the eyes are almost always immediately washed. The duration of contact in cases of intra-uterine infection may be hours or even days.

It is interesting to consider the question of prophylaxis as applied to these cases. The application of Credé's method would appear to us to be of service in those cases only in which the infection was

though less intense and more rapidly cured. We are, however, unwilling to accept this explanation, and believe that direct infection took place, even though much care was exercised.

very recent. Bellouard ascribes much benefit to it in Cases 12 and 15, but it was used in my case without benefit. Bellouard suggests the use of vaginal injections, especially in those cases in which the membranes rupture early. Pareschev used injections of mercuric chlorid (1 : 2000 or 1 : 3000) without benefit. Feis made frequent irrigations with one-and-a-half per cent. solution of carbolic acid, without preventing the appearance of the inflammation at birth ; Dianoux applied mercuric chlorid (1 : 100) and silver nitrate (1 : 100) frequently in the form of vaginal injections, besides Credé's method, and still the ophthalmia developed ten hours after birth. Aside from the danger of the use of such strong solutions of mercury, it appears that their benefit is far from having been proved, though they would seem to be indicated.

This form of ophthalmia neonatorum is fortunately very rare, as is shown by the meager number of cases reported, as well as by the fact that such large statistical tables as those of Credé appear to be unaffected by it.

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